How much is stronger DRM worth?

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There are many stakeholders in the production and use of Digital Rights Management (DRM) systems, and the incentives influencing their behaviour and the interactions between them are complex. In this paper I argue that it may well be more socially efficient to use market mechanisms to protect copyright holders, rather than spending large amounts of money on the development and deployment of stronger DRM mechanisms.

The most publicly visible proponents of DRM systems are those whose economic rights would be protected by them. Of these, the most prominent in the media are the record and movie industry associations. The message that they seem anxious to communicate to the public is that unauthorized duplication of music tracks will destroy the industry. They conflate the effects of commercial and private copying, and most of the messages seem to portray a general nervousness reminiscent of the Y2K 'crisis'.

Within the industry, though, organizations such as the British Phonographic Industry are painting a very different picture. The BPI's 'Market Information' newsletter for February 2003 put 'intense competition from other areas of the entertainment sector', and 'increasing economic uncertainty' before unauthorized copying of recorded music in the list of reasons for a drop in sales. It said further that 'despite the downturn in sales in 2002, UK record companies sustained sales of music at a very high level' and '[the market value] represents the second highest total ever achieved'. The figures also show that 'the volume of CD albums shipped in 2002 reached another all time high: 221.6m units' [4]. Given that the technology to duplicate music has been available to the consumer for many years, this hardly looks like an industry in desperate need of strong DRM protected from circumvention by legislation. A BBC News article in response to the same figures stated that 'the British record industry has experienced its biggest sales decline in decades' and that 'the BPI says piracy is the main factor' [7].

The purpose of DRM systems is to provide rights-holders with the means to control how their copyrighted materials can be used. For example, the holder of the copyright in an e-book might be able to time limit a purchaser's ability to read the book, or restrict the amount of material that can be printed out. This paves the way for far more finely grained market segmentation than is currently available in most media, and it is unclear whether having a diversity of licensing restrictions on content, enforced by DRM, will be socially efficient. This possibility for segmentation is already being exploited by some of the subscription services for music, who offer different levels of subscription with a varying number of downloads that can be transferred to permanent media, portable music players etc.

DRM systems are afforded further protection by articles 11 and 12 of the WIPO Copyright Treaty, which is implemented in national legislation such as the Digital Millennium Copyright Act in the US, and in implementations of the EU Copyright Directive in Europe. It states that 'Contracting Parties shall provide adequate legal protection and effective legal remedies against the circumvention of effective technological protection measures [...]' and also states the remedies should be provided against those who 'remove or alter any electronic rights management information without authority' or distribute, broadcast etc. any works from with the protection has been removed.

'Free uses' of copyright material cause significant problems in the implementation of DRM systems, as do the concepts of 'fair use' and 'fair dealing'. 'Free uses' are acts that can be carried out without the authorization of the copyright holder, and without any obligation to compensate him. 'Fair use' and 'fair dealing' can also take into account the 'nature and purpose of the use, including whether it is for commercial purposes' [1]. An example of this is quoting for the purposes of satire: it would be impossible to describe this limitation to protection in any DRM policy. This is a 'problem' that can only be solved at the social level. Furthermore, the circumvention of any DRM mechanism for the purposes of free use and fair use/fair dealing will be illegal under some proposed national legislation implementing the WIPO Copyright Treaty.

Even with the strongest DRM mechanisms we have today, the BORA (break once run anywhere) principle still holds. Once content is retrieved from a DRM system and re-encoded in a non-DRM protected form, the duplication of that content is as easy as moving the bits around. This means that the cost of breaking the DRM on a particular piece of content need only be borne once. The marginal costs of the duplication to the consumer who can obtain the content are near-zero, and furthermore the consumer need not expend any resources in breaking the DRM. Even in the extreme cases where the quality of the content is very low, as with Video CDs encoded from camcorder recordings illicitly made in cinemas, markets are created in these CDs. This suggests the DRM will do nothing at all to prevent the commercial copyright infringment that appears to be hurting the industry the most. Watermarking may go some way towards preventing this, but there are two obstacles to be overcome. The first is the ease with which some contemporary watermarking mechanisms can be defeated in a re-encoding process [2]. The second is that either legislation or market mechanisms must be used to make players that enforce policies on watermarked content ubiquitous. An alternative would be to use watermarking for the purposes of tracing the orginal from which the content was copied, but these watermarks may again be trivially removeable. Only weak DRM is needed to protect against casual copying, and even the strongest DRM systems available are unable to defeat a determined, well-resourced adversary.

A message peddled by the record industry is that they 'can't compete with free', but in fact it is far from clear that the costs of copyright infringement to the consumer of content are zero. Although the costs of exchanging the content once any DRM mechanism has been broken are close to zero, the costs of forming

the social networks necessary to support this exchange are far higher. In the case of the film trading 'scene', the amount of time necessary to make oneself a member of the community is high. In the case of most peer-to-peer networks, the costs of forming the networks have initially been borne by companies hoping to make money out of piggy-backing other services. The sunk costs of providing a network the provides the search features that an average consumer wants are high, however, and no company seems to have produced a business model capable of recouping them in any reasonable time.

There are also technical aspects that increase the transaction costs to the consumer of material on which copyright has been infringed. Many companies providing broadband access to consumers have started to put restrictions on the total amount of data that they can transfer in a given time period. To transfer the content on a DVD losslessly would consume nearly five days' quota with one popular UK cable operator [5]. There is also the issue that most consumer broadband systems are asymmetric, and hence the exchange of large amounts of content between broadband customers is necessarily slower than if they were downloading from a better-connected machine. It may no longer seem worthwhile to a broadband customer to exchange content with a person from whom he has no guarantee of getting anything in return, if the costs to him in terms of the use of his quota and the slowing down of his Internet connection are large.

We therefore see that exchanging content is not by any stretch of the imagination free, as is claimed by many content industry representatives. In obtaining content, we must take into consideration the costs of forming social networks necessary to get access to the material, and the costs in terms of time spent locating and downloading it. The costs in terms of usage of ISP allocated quota also become an issue when dealing with large video files, and people may become less altruistic in exchanging content with each other once these costs become more visible. The use of P2P networks often incurs high search costs in order to find quality content; only a service that offered good indexing and consistent, high-quality content would be a real threat to a content industry run offering.

The presence of these costs suggests that if the industry were willing to compete in supply of content with the 'free' services currently available, market mechanisms could achieve the goals that strong DRM systems were supposed to. Legislation already deals with combating large-scale commercial copyright infringement, although effective enforcement is sometimes lacking. The industry has significant advantages in reducing transaction costs of obtaining content to the consumer, even in the case of 'paid for' services.

The first advantage is that they can build on well-known record industry brands. They also have the necessary bargaining power to negotiate with ISPs for loosening of the quota restrictions for their particular content. This is especially likely given that bandwidth within ISPs is, to a first approximation, free, and the colocation of servers for content within large ISPs is a real possibility. The ISP would have an incentive to participate in such a scheme, as the colocation of industry-provided content might well reduce the usage of expensive, external bandwidth. The industry would also be able to provide easy sampling of audio

tracks/film clips before purchase, and much lower search costs. This could well lead to market selection in favour of 'paid for' services, if they are seen to save time and increase convenience in comparison with other systems.

Some companies are already moving in the direction such business models: in the US, Pressplay and MusicNet offer subscription based services, and 'dotmusic ondemand' has recently become available in Europe [3]. These services not only allow streaming of an unlimited number of tracks after a subscription is paid; they include a number of downloads that can be transferred to more permanent media such as CDRs. Some DRM is used in delivery of these services, but it is significantly weaker than some of the hardware-based schemes currently under consideration. This signals a shift from the traditional business model of selling music and video recordings as, for example, a book would be sold, to a service-based model where entertainment is provided on a subscription basis.

In conclusion, the evidence suggests that very little should be spent on the development and roll-out of stronger DRM mechanisms. The stated goals of the content owners can, to a large extent, be achieved by entering into competition with the 'free' services, and letting market mechanisms do their work. The lack of incentive for major investment in stronger DRM systems leads us to question if they are being developed solely to increase customer lock-in to specific technologies [6].

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